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Abstract

Optimizing thigmomorphogenetic effects for alternative growth regulation in potted horticultural crops by employment of air driven stimuli

The aim of this project is to develop a novel method for alternative growth inhibition on the basis of air movement, and to introduce this system into practice. It is targeted to design an automatic control of the stimulus intensity based on the evaluation and quantification of stress signals. Further alternative methods of growth regulation, such as climate control strategies, the application of plant strengtheners or the use of electrophysiological stimuli will be integrated into the project.

At the experimental station of the LVG Heidelberg the required strength and intensity of the stimulus to achieve a defined inhibitory effect will be recorded, documented and standardized for exemplary crops. Therefore already existing "plant petting systems" will be modified in cooperation with KNECHT Company. At Hohenheim University the chain of signals induced by the movement stimulus, as well as their physiological effects will be elucidated. Therefore non-invasive ethylene measurements will be performed within the plant stand, further relevant plant hormones will be analysed by Radio-Immuno-Assays (RIA) and measurements of chlorophyll fluorescence will be conducted. At Hamburg University further potential stress signals will be detected using electrophysiological methods. The acquired data will be used for a target-oriented control of the "thigmo-stress" system. An optimized, special irrigation carriage system will be mounted under practical conditions at an enterprise and will be evaluated under economical aspects. The results will be summarized in layman's terms to horticultural praxis, embedded into existing knowledge and published in the form of a guideline which also will include crop specific recommendations for the application of the growth inhibition system.